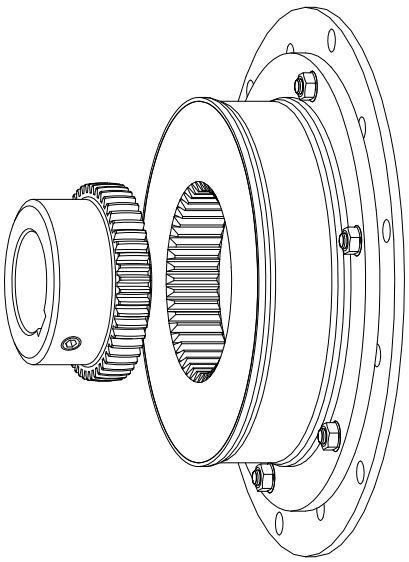
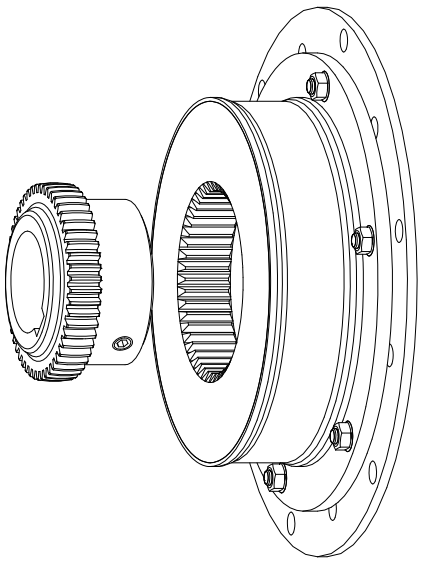
BoWex-ELASTIC®

highly flexible fange couplings types
HE1, HE2, HE3, HE4 and their combinations

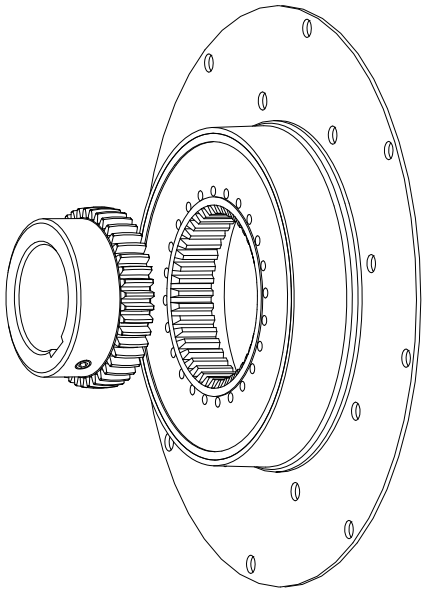
according to Standard 94/9/EC (ATEX 95)
for finish bored, pilot bored and unbored couplings



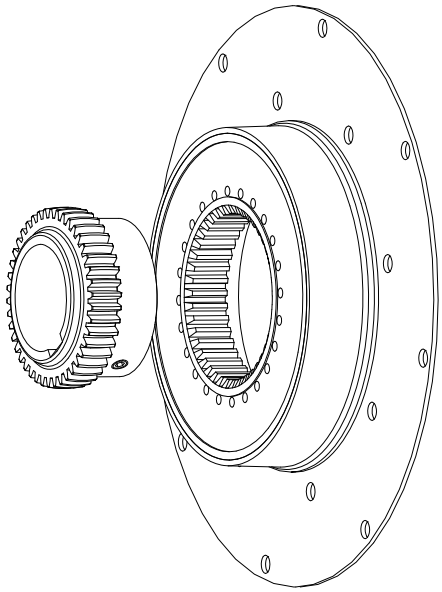
Type HE1



Type HE2



Type HE3



Type HE4

The **BoWex-ELASTIC®** is a highly flexible flange coupling. It dampens torsional oscillations, decreases shocks and is impact sound insulating. The **BoWex-ELASTIC®** coupling compensates for relatively considerable shaft displacements caused by e. g. inaccuracies in production, heat expansion etc.

Table of Contents

1 Technical Data

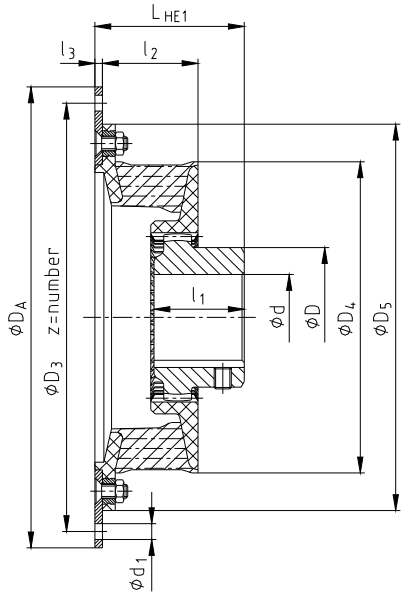


Illustration 1: BoWex-ELASTIC® type HE1

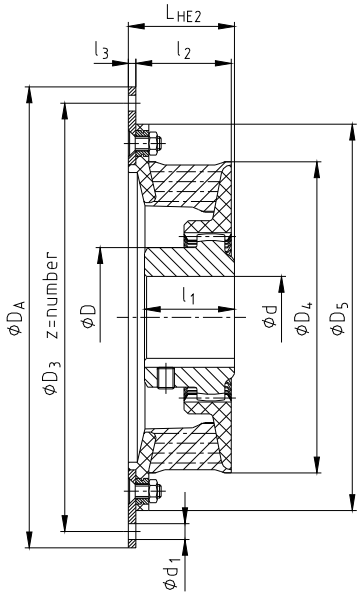


Illustration 2: BoWex-ELASTIC® type HE2

Table 1: Dimensions – Type HE1 and HE2

Size	Bore d [mm]		Flange connection according to SAE - J620						Dimensions [mm]							
	Pilot bored	Max.	6½“	7½“	8“	10“	11½“	14“	l_3	l_2	D_4	D_5	D	l_1	L_{HE1}	L_{HE2}
42 HE	-	42	●	●					4	45	146	180	65	42	70	50
					●											
48 HE	-	48	●	●					4	45	164	198	68	50	78	50
					●											
						●										
65 HE	-	65				●			5	55	205	244	96	55	85	62
							●									
80 HE	31	80				●			-	70	266	-	124	90	126	74
							●		6			316			132	80
G 80 HE	31	80					●		-	80	302	-	124	90	136	84
								●	6			356			142	90

Table 2: Technical data – Type HE1 and HE2

Size	Flange connection according to SAE - J620						Weight with pilot bored coupling [kg]	Mass moment of inertia with pilot bored coupling [kgm²]	
	6½“	7½“	8“	10“	11½“	14“		J_A	J_L
42 HE	●	●					2,7	0,0061	0,0014
			●				2,9	0,0083	0,0014
48 HE	●	●					2,9	0,0106	0,0019
			●				3,1	0,0148	0,0019
				●			3,9	0,0298	0,0019
65 HE				●			6,4	0,0377	0,0064
					●		7,2	0,0594	0,0064
80 HE				●			10,9	0,0211	0,0283
					●		13,0	0,0726	0,0283
G 80 HE					●		12,5	0,0402	0,0428
						●	17,3	0,2251	0,0428

1 Technical Data

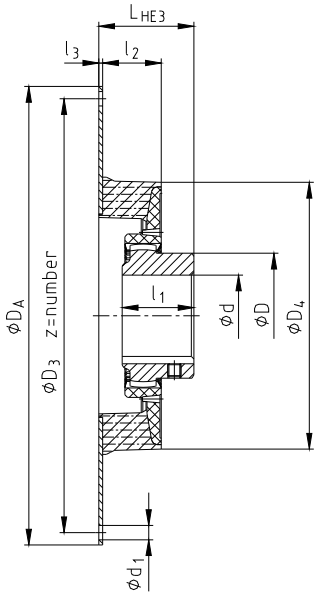


Illustration 3: BoWex-ELASTIC® type HE3

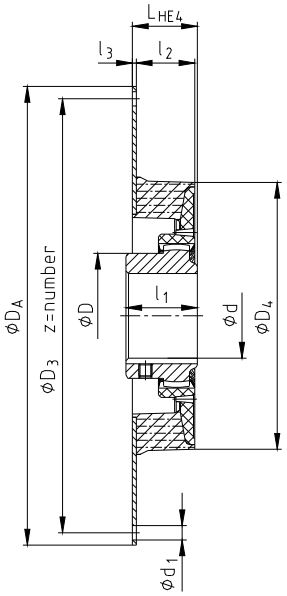


Illustration 4: BoWex-ELASTIC® type HE4

Table 3: Dimensions – Type HE3 and HE4

Size	Bore d [mm]		Flange connection according to SAE - J620										Dimensions [mm]						
	Pilot bored	Max.	6½“	7½“	8“	10“	11½“	14“	16“	18“	21“	24“	l_3	l_2	D_4	D	l_1	L_{HE3}	L_{HE4}
42 HE	-	42	●	●									2	33	145	65	42	55	40
48 HE	-	48		●									2	37	163	68	50	68	42
					●														
						●													
G 65 HE	21	65				●							3	45	205	96	55	73	50
							●												
80 HE	31	80				●							4	56	265	124	90	112	60
G 80 HE	31	80					●						4	66	300	124	90	122	70
100 HE	38	100						●					4	80	350	152	110	150	82
125 HE	45	125						●					-	92	416	192	140	186	103
									●				6					192	109
G 125 HE	45	125							●				6	89	440	192	140	179	91
										●									
150 HE	44	160								●			6	140	504	225	150	205	160
											●								
G 150 HE	44	160								●			6	140	504	225	150	205	160
											●								
200 HE	46	180									●		6	149	568	250	175	240	160
												●							
G 200 HE	46	180									●		6	149	600	250	175	240	160
												●							

1 Technical Data

Table 4: Technical data – Type HE3 and HE4

Size	Flange connection according to SAE - J620										Weight with pilot bored coupling [kg]	Mass moment of inertia with pilot bored coupling [kgm²]	
	6½“	7½“	8“	10“	11½“	14“	16“	18“	21“	24“		J_A	J_L
42 HE	•	•									1,7	0,0057	0,0014
48 HE		•									1,8	0,0060	0,0020
			•								2,0	0,0062	0,0020
				•							2,2	0,0065	0,0020
G 65 HE				•							5,3	0,0242	0,0076
					•						5,7	0,0372	0,0076
80 HE				•							11,4	0,0388	0,0305
G 80 HE					•						11,6	0,0702	0,0465
100 HE						•					24,1	0,1951	0,1019
125 HE						•					45,8	0,3013	0,2861
							•				47,7	0,4123	0,2861
G 125 HE							•				48,4	0,4781	0,2916
								•			50,5	0,6380	0,2916
150 HE								•			66,7	0,6918	0,5192
									•			1,1410	0,5192
G 150 HE								•			76	0,754	0,651
									•			1,246	0,651
200 HE									•		100	1,535	1,145
										•		1,514	1,145
G 200 HE									•		105	1,727	1,347
										•		2,106	1,347

Table 5: Flange dimensions according to SAE J 620

Size	Flange dimensions [mm]									
	6½“	7½“	8“	10“	11½“	14“	16“	18“	21“	24“
Dimension D_A	215,90	241,30	263,52	314,32	352,42	466,72	517,50	571,50	673,10	733,42
Dimension D_3	200,02	222,25	244,47	295,27	333,37	438,15	489,00	542,90	641,35	692,15
Quantity z	6	8	6	8	8	8	8	6	12	12
Dimension d_1	9	9	11	11	11	13	13	17	17	17

BoWex-ELASTIC® couplings with attached parts that can generate heat, sparks and static load (e. g. combinations with brake drums, brake disks, overload systems like torque limiters, impellers etc.) are <u>not</u> allowed for the use in hazardous areas.
A separate checking must be made.

2 Hints

2.1 Coupling Selection

C A U T I O N !
For a continuous and troublefree operation of the coupling it must be designed according to the selection instructions (according to DIN 740 part 2) for the particular application (see BoWex-ELASTIC® catalogue).
If the operating conditions (performance, speed, changes on engine and machine) change, the coupling selection must be checked again.
Please make sure that the technical data regarding torque only refers to the sleeve. The transmissible torque of the shaft/hub connection must be checked by the orderer, and he is responsible for the same.

For drives with dangerous torsional vibration (drives with periodical load on torsional vibration) it is necessary to make a torsional vibration calculation to ensure a perfect selection. Typical drives with dangerous torsional vibration are e. g. drives with diesel engines, piston pumps, piston compressors etc. On request KTR will perform the coupling selection and the torsional vibration calculation.

2.2 General Hints

Please read through these mounting instructions carefully before you set the coupling into operation.
Please pay special attention to the safety instructions!

The **BoWex-ELASTIC®** coupling is suitable and approved for the use in hazardous areas. When using the coupling in hazardous areas please observe the special hints and instructions regarding safety mentioned in enclosure A.

The mounting instructions are part of your product. Please keep them carefully and close to the coupling.
The copyright for these mounting instructions remains with **KTR** Kupplungstechnik GmbH.

2.3 Safety and Advice Hints

D A N G E R !	**Danger of injury to persons.**
C A U T I O N !	**Damages on the machine possible.**
A T T E N T I O N !	**Pointing to important items.**
P R E C A U T I O N !	**Hints concerning explosion protection.**

2 Hints

2.4 General Hints of Danger

D A N G E R !
With assembly, operation and maintenance of the coupling it has to be made sure that the entire drive train is protected against unintentional engagement. You can be seriously hurt by rotating parts. Please make absolutely sure to read through and observe the following safety instructions.

- All operations on and with the coupling have to be performed taking into account "safety first".
- Please make sure to disengage the power pack before you perform your work.
- Protect the power pack against unintentional engagement, e. g. by providing hints at the place of engagement or removing the fuse for current supply.
- Do not touch the operation area of the coupling as long as it is in operation.
- Please protect the coupling against unintentional touch. Please provide for the necessary protection devices and caps.

2.5 Proper Use

You may only assemble, operate and maintain the coupling if you

- carefully read through the mounting instructions and understood them
- had technical training
- are authorized to do so by your company

The coupling may only be used in accordance with the technical data (see table 1 to 5 in chapter 1). Unauthorized modifications on the coupling design are not admissible. We do not take any warranty for resulting damages. To further develop the product we reserve the right for technical modifications.
The **BoWex-ELASTIC®** described in here corresponds to the technical status at the time of printing of these mounting instructions.

3 Storage

The coupling hubs are supplied in preserved condition and can be stored at a dry and roofed place for 6 - 9 months.
The features of the elastomer parts remain unchanged for up to 5 years in case of favourable storage conditions.

C A U T I O N !
The storage rooms may not include any ozone-generating devices, like e. g. fluorescent light sources, mercury-vapour lamps or electrical high-voltage appliances.
Humid storage rooms are not suitable.
Please make sure that there is no condensation. The best relative air humidity is below 65%.

4 Assembly

Before assembly the coupling has to be inspected for completeness.

4.1 Components of the Couplings

Type HE1 and HE2

Component	Quantity	Designation
1	1	Elastomer part
2	1	Hub
3	1	Connection flange
4	see Table 4	Countersunk screw DIN EN ISO 10642
5	see Table 4	Hexagon head screw DIN EN ISO 4032
6	1	Setscrew DIN EN ISO 4029

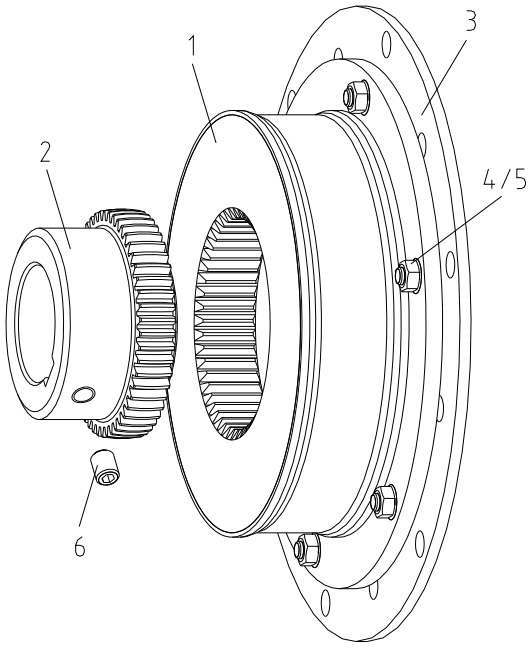


Illustration 5: BoWex-ELASTIC® type HE1

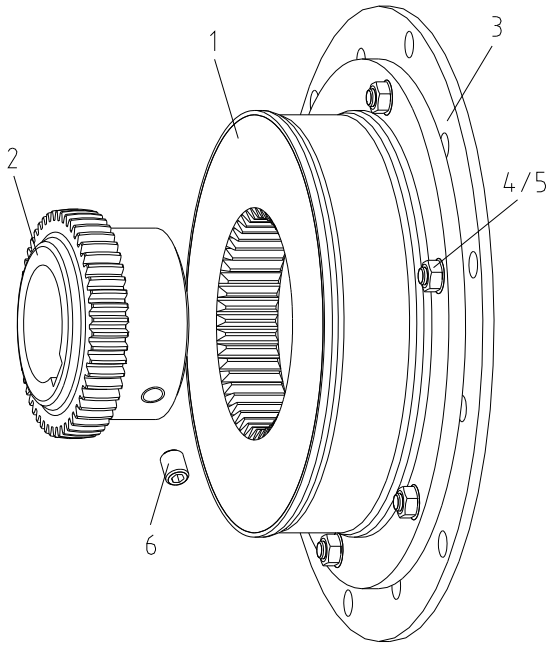


Illustration 6: BoWex-ELASTIC® type HE2

Table 6:

Size	42 HE	48 HE	65 HE	80 HE	G 80 HE
Screw size	M6	M6	M8	M10	M10
Quantity (screw and nut) z_1	6	8	8	8	8
Tightening torque T_A [Nm]	14	14	35	69	69

4 Assembly

4.1 Components of the Couplings

Type HE3 and HE4

Component	Quantity	Designation
1	1	Elastomer part
2	1	Hub
6	1	Setscrew DIN EN ISO 4029

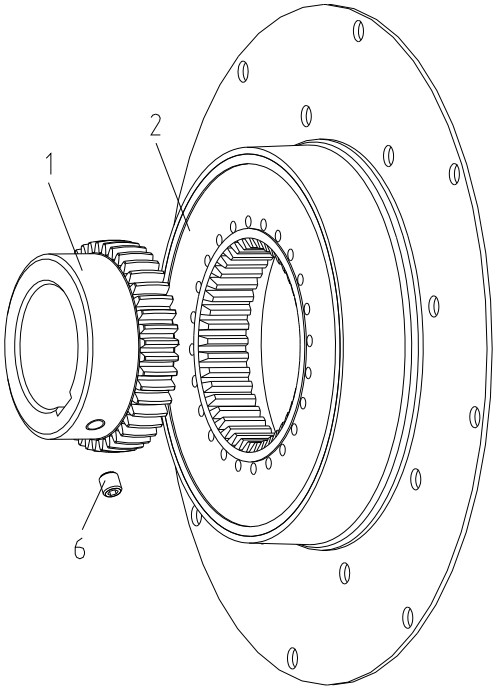


Illustration 7: BoWex-ELASTIC® type HE3

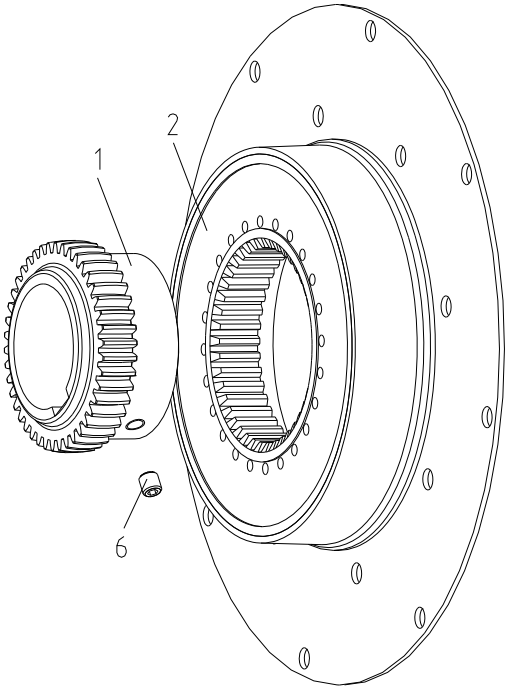


Illustration 8: BoWex-ELASTIC® type HE4

4.2 Hint Regarding the Finish Bore

STOP

D A N G E R !
The maximum permissible bore diameters d (see table 1 to 5 in chapter 1 - Technical Data) must not be exceeded. If these figures are disregarded, the coupling may tear. Rotating particles may cause serious danger.

- Hub bores (steel hubs) machined by the customer have to observe concentric running or axial running, respectively (see illustration 9).
- Please make absolutely sure to observe the figures for d_{max}.
- Carefully align the hubs when the finish bores are brought in.
- Please use a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the hubs axially.

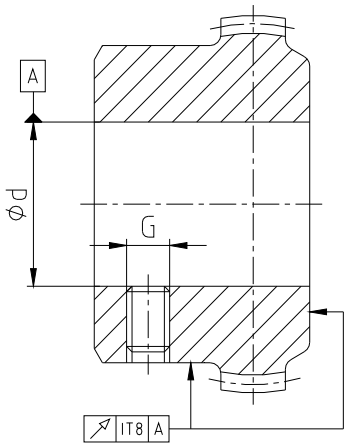


Illustration 9: concentric running and axial running

4 Assembly

4.2 Hint Regarding the Finish Bore

C A U T I O N !
The orderer is responsible for all subsequently made machinings to unbored or pilot bored and to finish machined coupling parts and spare parts. KTR does not assume any warranty claims resulting from insufficient refinish.

Table 7: Setscrews according to DIN EN ISO 4029

Size	42 HE	48 HE	65 HE G 65 HE	80 HE G 80 HE	100 HE	125 HE G 125 HE	150 HE G 150 HE	200 HE G 200 HE
Dimension G	M8	M8	M10	M10	M12	M16	M16	M16
Tightening torque T_A [Nm]	10	10	17	17	40	80	80	80

4.3 Assembly of the Hubs

A T T E N T I O N !
We recommend to check bores, shaft, keyway and feather key for dimensional accuracy before assembly.

Heating the hubs slightly (approx. 80 °C) allows for an easier installation onto the shaft.

P R E C A U T I O N !
Please pay attention to the danger of ignition in hazardous areas.

D A N G E R !
Touching the heated hubs causes burns.
We would recommend to wear safety gloves.

- Assemble the hubs onto the shaft of the output machine.
- Secure the coupling hub by tightening the setscrew DIN EN ISO 4029 with cup point or by an end disk.
- Assemble the flange into the centering of the flywheel.
- First hand-screw the parts.
- Tighten the screws with a suitable dynamometric key up to the tightening torques T_A indicated in table 8.
- Secure the screwing with a suitable screw glue.

C A U T I O N !
Please observe the manufacturer´s instructions when using the glue.
Do not put any glue onto the rubber surfaces.

4 Assembly

4.3 Assembly of the Hubs

Table 8: Screw tightening torques for screwing the external flange to the engine flywheel

Size of the flywheel acc. to SAE J620d	-	6 ½“	7 ½“	8“	10“	11 ½“	14“	16“	18“	21“	24“
Screw size	M6	M8		M10			M12		M16		
Tightening torque [Nm]	10	25		49			120		295		
Minimum screw strength	8.8						10.9				
Inch screw	-	5/16 - 18		3/8 - 16			1/2 - 13		5/8 - 11		
Tightening torque [Nm]	-	24		42			150		286		
Minimum screw strength	5						8				

- Displace the machine parts axially until the assembly dimension L_{HE1}, L_{HE2}, L_{HE3} or L_{HE4} is reached.

C A U T I O N !
For the assembly please make sure that the hub toothing is covered completely by the internal toothing of the elastomer part. (Please observe the assembly dimensions L_{HE1}, L_{HE2}, L_{HE3} or L_{HE4}). In case of non-observance, the coupling can be damaged.

- If the position of the machine parts has already been indicated previously, the assembly dimension can be adjusted by an axial displacement of the hub on the shaft.

4.4 Displacements - Alignment of the Couplings

The **BoWex-ELASTIC®** flange couplings accept a displacement of the machine parts to be connected up to the data indicated in table 9.
In case of the alignment, the radial and angular displacement should be as slight as possible, because the service life is increased hereby under the same operating conditions.

The alignment of the **BoWex-ELASTIC®** flange coupling has to be effected from the shaft-sided coupling hub to one of the processed surfaces of the flywheel or the machine.

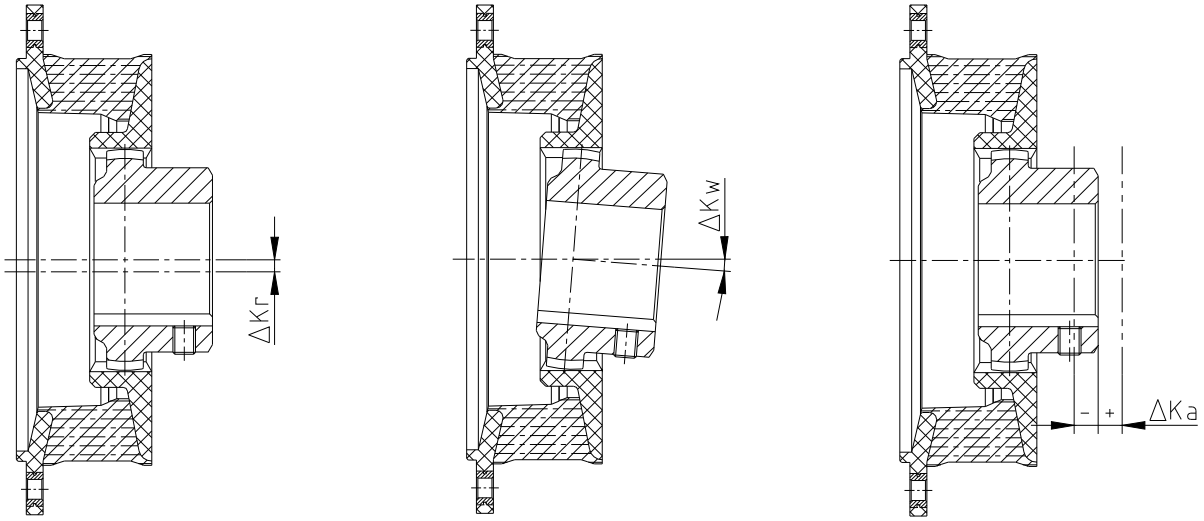
C A U T I O N !
In order to ensure a long service life of the coupling and to avoid dangers regarding the use in hazardous areas, the shaft ends must be accurately aligned.
Please absolutely observe the displacement figures indicated (see table 9). If the figures are exceeded, the coupling is damaged.
The more accurate the alignment of the coupling, the higher is its lifetime.
In case of a use in hazardous areas for the explosion group IIC (marking II 2GD c IIC T X), only half of the displacement figures (see table 9) are permissible.

Please note:

- The displacement figures mentioned in table 9 are maximum figures which must not arise in parallel. If radial and angular displacement arises in parallel, the permissible displacement figures may only be used proportionately (see illustration 11).
- The displacement figures mentioned are general figures that apply up to an ambient temperature of 80 °C, ensuring a sufficient service life of the **BoWex-ELASTIC®** coupling.
  Displacement figures between the speeds indicated have to be interpolated accordingly. If necessary, please ask about the displacement for the corresponding coupling type.
- Please check with a dial gauge, ruler or feeler whether the permissible displacement figures of table 9 can be observed.

4 Assembly

4.4 Displacements - Alignment of the Couplings



Radial displacement | Angular displacement | Axial displacement

Illustration 10: displacements

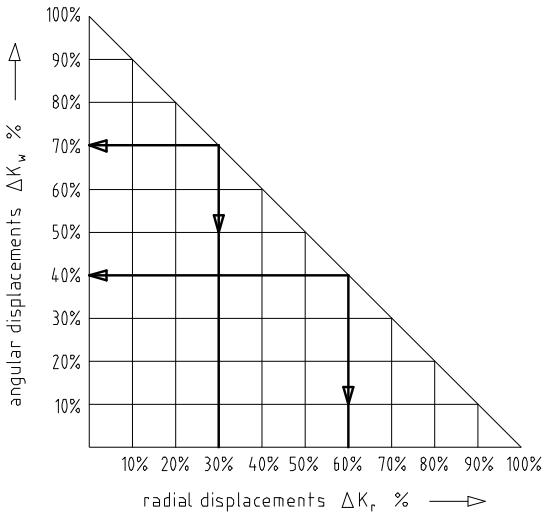
Example for the misalignment combinations given in illustration 11:

Example 1:
ΔK_r = 30 %
ΔK_w = 70 %

Example 2:
ΔK_r = 60 %
ΔK_w = 40 %

$$\Delta K_{total} = \Delta K_r + \Delta K_w \leq 100\ \%$$

Illustration 11: combinations of displacement



4 Assembly

4.4 Displacements - Alignment of the Couplings

Table 9: Displacement figures

Displacement figures	Elastomer hardness [Shore A]	Size							
		42 HE	48 HE	65 HE G 65 HE	80 HE G 80 HE	100 HE	125 HE G 125 HE	150 HE G 150 HE	200 HE G 200 HE
Perm. radial displacement with n=1500 1/min. ΔK_r [mm]	40	1,1	1,2	1,6	1,8	2,2	2,5	2,8	3,0
	50 [2]	1,0	1,1	1,5	1,7	2,0	2,3	2,5	2,7
	65 [3]	0,5	0,5	0,7	0,8	1,0	1,1	1,3	1,5
Perm. radial displacement with n=3000 1/min. ΔK_r [mm]	40	0,8	1,1	1,4	1,6	2,0	2,2	2,5	2,8
	50 [2]	0,7	1,0	1,3	1,5	1,8	2,0	2,2	2,5
	65 [3]	0,4	0,4	0,5	0,6	0,8	0,8	1,0	1,2
Max. radial displacement $\Delta K_{r\,max.}$ [mm] [1]	40	3,6	3,8	5,1	5,7	6,5	7,5	8,0	8,5
	50 [2]	3,3	3,5	4,7	5,3	6,0	6,9	7,5	8,0
	65 [3]	1,5	1,7	2,2	2,4	3,0	3,3	4,0	4,5
Perm. angular displacement with n=1500 1/min. ΔK_w [degree]	40	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
	50 [2]	0,75	0,75	0,75	0,75	0,75	0,75	0,75	0,75
	65 [3]	0,50	0,50	0,5	0,50	0,50	0,50	0,50	0,50
Perm. angular displacement with n=3000 1/min. ΔK_w [degree]	40	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50
	50 [2]	0,40	0,40	0,40	0,40	0,40	0,40	0,40	0,40
	65 [3]	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25
Max. angular displacement $\Delta K_{w\,max.}$ [degree] [1]	40/50 [2]/ 65 [3]	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Perm. axial displacement ΔK_a [mm]	40/50 [2]/ 65 [3]	± 2	± 2	± 2	± 2	± 3	± 3	± 5	± 5

1) for short starting drive
2) with size 150 = 52 Sh A
3) with size 125 = 70 Sh A; size 150 = 68 Sh A

4.5 Spares Inventory, Customer Service Addresses

A basic requirement to guarantee the operational readiness of the coupling is a stock of the most important spare parts on site.

Contact addresses of the KTR partners for spare parts and orders can be obtained from the KTR homepage at www.ktr.com.

☞ **A T T E N T I O N !**
KTR does not assume any liabilities or warranties regarding the use of spare parts and accessories which are not provided by KTR and for the damages resulting herefrom.

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

Type HE1 and HE2: Hub/Elastomer part/Connection flange
Type HE3 and HE4: Hub/Elastomer part

5.1 Use in Ex Hazardous Areas According to the Regulations

Conditions of operation in Ex hazardous locations

BoWex-ELASTIC® couplings are suitable for the use according to EC standard 94/9/EC.

1. Industry (with the exception of mining)

- device class II of category 2 and 3 (*coupling is not approved for device class 1*)
- media class G (*gases, fogs, steams*), zone 1 and 2 (*coupling is not approved for zone 0*)
- media class D (*dusts*), zone 21 and 22 (*coupling is not approved for zone 20)*
- explosion class IIC (*explosion class IIA and IIB are included in IIC*)

Temperature class:

Temperature class	Ambient or operating temperature	Max. surface temperature [1]
T4, T3, T2, T1	- 30 °C to + 80 °C	115 °C [2]
T5	- 30 °C to + 65 °C	100 °C
T6	- 30 °C to + 50 °C	85 °C

Explanation:
The maximum surface temperatures each result from the permissible ambient or operating temperature T_a plus the maximum temperature increase ΔT of 35 K which has to be taken into account.

1) The ambient or operating temperature T_a is limited to + 80° C by the permissible permanent operating temperature of the BoWex-ELASTIC® elastomer parts used.

2) The maximum surface temperature of 115 °C applies for the use in locations which are potentially subject to dust explosion, too.

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.2 Control Intervals for Couplings in Ex Hazardous Areas

Explosion group	Control intervals
3G 3D	For couplings which are classified in category 3G or 3D the operating and assembly instructions that are usual for standard operation apply. During the standard operation which has to be subject to the analysis of danger of ignition the couplings are free from any ignition source. Merely the temperature increase produced by proper heating and depending on the coupling type has to be considered: for BoWex-ELASTIC®: $\Delta T = 35$ K
II 2GD c IIB T4, T5, T6	A review of the circumferential backlash and a visual inspection of the flexible elastomer part must be effected after 1,000 operating hours for the first time, after 6 months at the latest. If you note unconsiderable or no wear on the elastomer part after this first inspection, the future inspections can be effected, in case of the same operating parameters, respectively after 2,000 operating hours or after 18 months at the latest. If you note considerable wear during the first inspection, so that a change of the elastomer part would be recommended, please find out the cause according to the table „Breakdowns“, as far as possible. The maintenance intervals must be adjusted according to the changed operating parameters.

BoWex-ELASTIC®

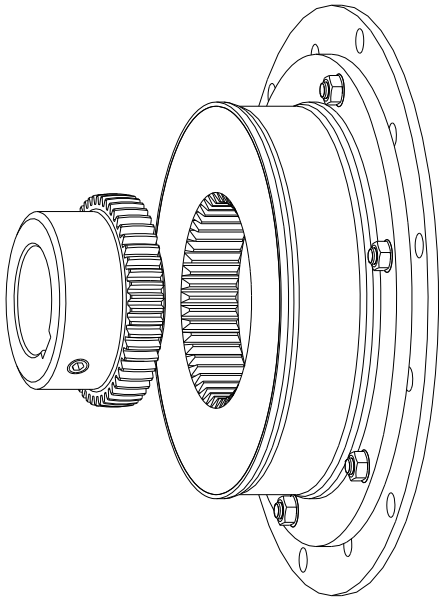


Illustration 12: BoWex-ELASTIC® type HE

Here the backlash between the hub and the nylon toothing must be checked by a torsional backlash, separately from the drive and the driven end.
The friction / wear may only be $\mathbf{X_{max.}}$ of the original toothing strength before the elastomer part must be replaced.
When reaching the torsional backlash $\mathbf{\Delta S_{max.}}$ the elastomer part must be replaced immediately, irrespective of the inspection intervals.

- Visual inspection of the elastomer part (fractures, holes or similar).

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.3 Checking of Torsional Backlash

C A U T I O N !
To check the torsional backlash the driving power pack turned off must be secured against unintended switching on.

- Turn the hub in opposite direction to the direction of drive.

C A U T I O N !
Here the elastomer part may not be axially displaced from its wear position.

- Mark elastomer part and hub (see illustration 13).
- Turn the hub in the direction of drive and measure the torsional backlash $\Delta S_{max.}$
- When reaching the torsional backlash ΔS_{max} the elastomer part must be replaced.

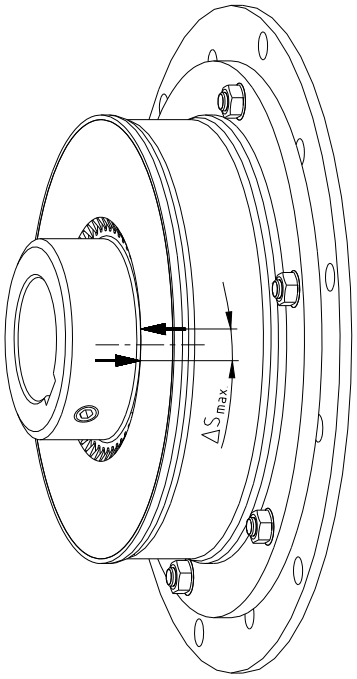


Illustration 13: marking of the elastomer part and the hub

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.4 Approximate Values of Wear

If the torsional backlash is ≥ $\Delta S_{max.}$ [mm] / friction ≥ $X_{max.}$ [mm], the elastomer part must be replaced.

Reaching the exchange values depends on the operating conditions and the existing operating parameters.

C A U T I O N !
In order to ensure a long lifetime of the coupling and to avoid dangers regarding the use in hazardous areas, the shaft ends must be accurately aligned.
Please absolutely observe the displacement figures indicated (see table 9). If the figures are exceeded, the coupling is damaged.

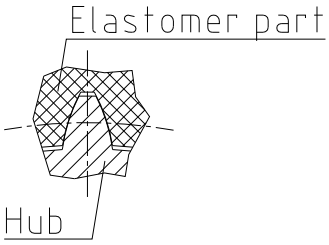


Illustration 14: elastomer part in new condition

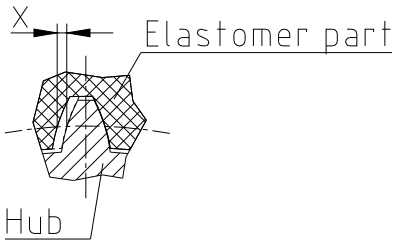


Illustration 15: wear of elastomer part

Table 10:

Size	Limits of wear		Size	Limits of wear	
	Friction $X_{max.}$ [mm]	Torsional backlash $\Delta S_{max.}$ [mm]		Friction $X_{max.}$ [mm]	Torsional backlash $\Delta S_{max.}$ [mm]
42	1,0	1,7	100	1,8	3,1
48	1,0	1,8	125	2,0	3,5
65	1,4	2,5	150	2,5	4,0
80	1,6	2,7	200	2,5	4,0

5.5 Ex Marking of Coupling for the Hazardous Area

The ATEX marking of the BoWex-ELASTIC® coupling is performed on the polyamide flange of the elastomer indicating the following details:

Short labelling:
(standard)

Ex II 2GD c IIB T X

Complete labelling:

Ex II 2G c IIB T6, T5 bzw. T4
- 30 °C ≤ T_a ≤ + 50°C, + 65 °C bzw. + 80 °C
II 2D c T 115 °C - 30 °C ≤ T_a ≤ + 80 °C

The labelling with Explosion Group IIB included the Explosion Group IIA.

C A U T I O N !
The orderer is responsible for all subsequently made machinings to unbored or pilot bored and to finish machined coupling parts and spare parts. KTR does not assume any warranty claims resulting from insufficient refinish.

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.6 Starting

Before putting the coupling into operation, check the tightness of the setscrews in the hubs, the alignment and the distance dimensions L_{HE1}, L_{HE2}, L_{HE3} or L_{HE4} and correct, if necessary, and also check all screw connections regarding the stipulated tightening torques dependent on the type of coupling.

Ex If used in hazardous areas the grub screws to fix the hub as well as all screw connections must be additionally secured against self-loosening, e. g. glue with Loctite (medium strength).

Last but not least, the coupling protection against unintended contact must be fixed.

The cover must be electrically conductive and be included in the equipotential bonding. Bellhousings (magnesium part below 7,5 %) made from aluminium and damping rings (NBR) can be used as connecting element between pump and electric motor. The cover may only be taken off after having stopped the unit.

During operation, please pay attention to

- strange running noises
- occurring vibrations.

If the couplings are used in dust explosive areas and in mining the operator must make sure that there is no accumulation of dust in a critical quantity between the cover and the coupling. The coupling must not operate in an accumulation of dust.

For covers with unlocked openings on the upper side no light metals may be used if the couplings are used as appliances of appliance group II (*if possible, from stainless steel*).

The minimum distance „Sr“ between the protection device and the rotating parts must at least correspond to the figures mentioned below.

If the protection device is used as cover, regular openings complying with the explosion protection demands can be made that must not exceed the following dimensions:

Openings	Cover [mm]		
	Top side	Lateral parts	Distance „Sr“
Circular - max. diameter	4	8	≥ 10
Rectangular - max. lateral length	4	8	≥ 10
Straight or curved slot - max. lateral length/height	prohibited	8	≥ 20

! **C A U T I O N !**
If you note any irregularities with the coupling during operation, the drive unit must be turned off immediately. The cause of the breakdown must be found out with the table „Breakdowns“ and, if possible, be eliminated according to the proposals. The potential breakdowns mentioned can be hints only. To find out the cause all operating factors and machine components must be considered.

Coupling layer:

Ex If coated (priming, painting etc.) couplings are used in hazardous areas, the requirements to conductability and layer thickness must be considered. In case of paintings up to 200 µm no electrostatic load can be expected. Multiple coatings exceeding a thickness of 200 µm are prohibited for explosion group IIC.

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.7 Breakdowns, Causes and Elimination

The below-mentioned errors can lead to an incorrect use of the **BoWex-ELASTIC®** coupling. In addition to the stipulations in these operating and mounting instructions please make sure to avoid these errors.
The errors listed can only be clues to search for the errors. When searching for the error the adjacent components must be generally included.

Ex Due to incorrect use the coupling may become a source of ignition.
EC Standard 94/9/EC requires a special care from the manufacturer and the user.

General errors of incorrect use

- Important data for the coupling selection were not forwarded.
- The calculation of the shaft/hub connection was not considered.
- Coupling parts with damage occurred during transport are assembled.
- If the heated hubs are assembled, the permissible temperature is exceeded.
- The fits of the parts to be assembled are not coordinated with each other.
- Tightening torques are fallen below/exceeded.
- Components are replaced by mistake/put together incorrectly.
- No original KTR parts (purchased parts) are used.
- Old elastomer parts/already worn out elastomer parts or elastomer parts that were stored too long are used.
- The coupling used/the coupling protection used is not suitable for the operation in hazardous areas and does not correspond to EC Standard 94/9/EC, respectively.
- Maintenance intervals are not observed.

Breakdowns	Causes	Hints to danger for hazardous areas	Elimination
change of the running noises and / or occurring vibrations	misalignment micro friction at the toothing of the elastomer part	danger of ignition due to hot surfaces	1) put the unit out of operation 2) eliminate the reason for the misalignment (e. g. loose foundation bolts, fracture of the engine fixing, heat expansion of unit components, change of the assembly dimension E of the coupling) 3) checking of wear see under point 5.4
	loose screws for axial securement of hubs	danger of ignition due to hot surfaces	1) put the unit out of operation 2) check alignment of coupling 3) tighten the screws to secure the hubs and secure against self-loosening 4) checking of wear see under point 5.4
break of the elastomer part / toothing	break of the elastomer part / toothing due to high shock energy / overload	---	1) put the unit out of operation 2) disassemble the coupling and remove remainders of the elastomer part 3) check coupling parts and replace damaged coupling parts 4) insert elastomer part, assemble coupling parts 5) find out the reason for overload

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.7 Breakdowns, Causes and Elimination

Breakdowns	Causes	Hints to danger for hazardous areas	Elimination
break of the elastomer part / toothing	operating parameters do not correspond to the performance of the coupling	---	1) put the unit out of operation 2) check the operating parameters and select a larger coupling (consider installation space) 3) assemble new coupling size 4) check alignment
	mistake in service of the unit	---	1) put the unit out of operation 2) disassemble the coupling and remove remainders of the elastomer part 3) check coupling parts and replace damaged coupling parts 4) insert elastomer part, assemble coupling parts 5) instruct and train the service staff
excessive wear at the elastomer part / toothing	drive vibrations	danger of ignition due to hot surfaces	1) put the unit out of operation 2) disassemble the coupling and remove remainders of the elastomer part 3) check coupling parts and replace damaged coupling parts 4) insert elastomer part, assemble coupling parts 5) check alignment, correct if necessary 6) find out the reason for the vibrations
	ambient / contact temperatures which are too high for the elastomer part, max. permissible e. g. T4 = -30 °C / +100 °C	danger of ignition due to hot surfaces	1) put the unit out of operation 2) disassemble the coupling and remove remainders of the elastomer part 3) check coupling parts and replace damaged coupling parts 4) insert elastomer part, assemble coupling parts 5) check alignment, correct if necessary 6) check and regulate ambient / contact temperature
	e. g. contact with aggressive liquids / oils, ozone-influence, too high ambient temperatures etc. effecting a physical change of the elastomer part	---	1) put the unit out of operation 2) disassemble the coupling and remove remainders of the elastomer part 3) check coupling parts and replace damaged coupling parts 4) insert elastomer part, assemble coupling parts 5) check alignment, correct if necessary 6) make sure that further physical changes of the elastomer part are excluded

Ex If you operate with a worn elastomer part (see item 5.2) a proper operation meeting the explosion protection requirements and acc. to Standard 94/9/EC is not ensured.

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.8 EC Certificate of Conformity

EC Certificate of Conformity

corresponding to EC Standard 94/9/EC dated 23 March 1994
and to the legal regulations

The manufacturer - KTR Kupplungstechnik GmbH, D-48432 Rheine - states that the

BoWex-ELASTIC® - highly flexible flange couplings

described in these mounting instructions and designed for explosion protection correspond to Article 1 (3) b) of Standard 94/9/EC and comply with the general Safety and Health Requirements according to enclosure II of Standard 94/9/EC.

The BoWex-ELASTIC® - highly flexible flange coupling is in accordance with the specifications of the standard 94/9/EC. One or several standards mentioned in the corresponding EC type test certificate IBExU01ATEXB004_05 X were in part replaced by updated versions.
KTR Kupplungstechnik GmbH as the manufacturer confirms that the product mentioned above is in accordance with the specifications of the new standards, too.

According to article 8 (1) of Standard 94/9/EC the technical documentation is deposited with the:

IBExU
Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7

09599 Freiberg

Rheine, 03.07.2012 Date

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Engineering Manager

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Josef Schürhörster
Product Manager